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Pana Alves,[*] Daniel Dejuan[**] and Laurent Maurin[***]

Abstract

This study illustrates how information from micro-level and survey-based databases can be used, along with macroeconomic indicators, to provide a better understanding of corporates´ investment obstacles.

We investigate impediments to corporate investment across the EU. We use a novel dataset merging firm level data from the European Investment Bank Investment Survey (EIBIS) and hard data from corporations' balance sheet and P&L information.

We show that the indicators that can be derived from aggregating qualitative answers on impediments to investment at the country level correlate relatively well with macro-based hard data, commonly used as determinants of investments in macro-based models. Notwithstanding this, the perceptions reported by the corporations tend to be related to firms' specific characteristics: "weaker" firms defined as firms that are smaller, and/or more indebted, and/or less profitable and/or with lower liquidity positions, tend to report more impediments.

After controlling for firm specific characteristics, the perceived investment gap remains correlated with the reported impediments. While access to finance is not the most reported obstacle, reporting it has the highest information content. Moreover, the signal intensifies when it is given by "weaker" firms.

From a policy point of view, our findings suggest that survey-based information can be a useful input to complement hard data, both macro and micro, and better inform the design of targeted policies to support investment.

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Contents

1. Introduction

Investment is a key factor to sustain long-run economic growth and a major contributor to business cycle fluctuations. The collapse of corporate investment in 2008 and its relatively weak recovery in the aftermath of the crisis has renewed interest among academics and policy makers to improve the understanding of the drivers and obstacles to investment. After years of underinvestment, with potentially long lasting negative consequences on potential growth and firms' productivity, it has become crucial to have a clearer picture of the obstacles that corporations face in their investment decisions. In this paper, we use a recent survey conducted by the European Investment Bank (EIB). Based on granular data matching both hard and survey data at the level of each firm, we illustrate how barriers to investment actually correlate with investment needs and how they result in investment gaps.

Investment drivers and obstacles have been widely discussed in the literature, both from a theoretical and an empirical perspective. At its core, the decision to invest is a profit maximization problem where the optimal capital stock is determined by factors both, internal and external to the firm. Traditional neoclassical models emphasize the role played by growth opportunities and the user cost of capital in shaping investment decisions (Jorgenson, 1963), channels which have been widely backed by empirical evidence (Bond and Van Reenen, 2003). Furthermore, numerous studies have corroborate that financial constraints have a significant negative effect on investment beyond the cost of raising

external finance (Fazzari et al., 1988; Hennessy et al., 2007). In addition to financial frictions, whenever investment decisions suffer some degree of irreversibility, policy and economic uncertainty is shown to delay investment projects (Abel and Eberly, 1994). This is the so called "wait-and-see" effect of uncertainty, which can affect both, the timing and level of investment. Finally, another branch of the literature highlights that regulation, taxation and the efficacy of the judicial system also affect investment decisions (Alesina et al., 2005; Acemoglu and Johnson, 2005).

Determining the relative importance of these factors in explaining investment decisions is a difficult task, especially using macroeconomic indicators as the impact is likely to depend on companies´ characteristics. Moreover, because it is challenging to gather both information about a wide range of different investment obstacles and detailed information regarding investment decisions. Hence, some have studied barriers to investment using survey data (Beck et al., 2005; Ferrando and Mulier, 2013; European Commission, 2017).

In this paper, we exploit the European Investment Bank Investment Survey (EIBIS), to shed light on this issue. The EIBIS provides a way to illustrate each of these channels, as firms report impediment to investment resulting from demand, uncertainty, finance, regulation (both business and labor) and others. The EIBIS is a granular dataset collecting information on around 12,500 non-financial corporations.[1] The survey has been conducted over two years, 2016 and 2017.[2] Besides being granular, representative, and enabling micro-analysis, the survey brings qualitative information not available in hard data and it is unique in terms of the wide coverage of obstacles considered. Our analysis exploits information about impediments to investment and the perceived investment gap.

We match firm level data from EIBIS with balance sheet and profit and loss (P&L) information as collected by ORBIS. We then link firms' investment gap with firms' impediments to investment, while controlling for firms' characteristics. This allows us to investigate the relative role of obstacles in explaining the perceived investment gap while controlling at the same time for firm specific characteristics such as size, sector and financial position. We provide novel evidence on the relative importance that different obstacles may have in explaining the investment gap that firms report to experience in their recent activity.

The main findings of the paper are threefold. First, we show that survey-based measures provide a reliable source of the channels explaining investment as they correlate rather well with macro-based hard data compile at the country level. Hence, signals for corporate investment can be extracted from the survey, especially for cross-country comparisons. Second, we show that "weaker" firms, defined as those defined as smaller, and/or more indebted, and/or less profitable and/or with lower liquidity positions, tend to report more impediments. Whether this reflects the endogeneity of the firm to its environment or some bias in the perceptions is left to further research. Third, we show that, controlling for the firms characteristics, reporting an impediment provides a signal for investment. Firms reporting impediments are more likely to report an investment gap, with a stronger magnitude when the impediment is reported as major. The signal intensifies when it is given by firms that are smaller or more indebted. As we do not find such dependency on the region, our results do not support that corporations located in the periphery continue to be discriminated for systemic reasons years after the end of the crisis.

The rest of the paper consists of four sections, concluding remarks, and two annexes. In the second section, we provide an overview of the barriers to investment as reported in the EIBIS. In the third

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[1] In the rest of the paper, firms, companies, enterprises or corporates always refer to non-financial corporations.
[2] A third wave was under development at the time of preparing this paper. See Appendix 1 for a detailed description of the survey.

section, we elaborate on the literature on investment determinants and show that five of them are explicitly covered in the survey, namely, growth opportunities, financial frictions, uncertainty and business and labor market regulation. We show that their survey-based measures correlate relatively well with macro-based measures traditionally used to gauge them. In the fourth section, we show that factors internal to the firm are also related to the perception of barriers to investment. In the fifth section, we evaluate the relative role of these obstacles in explaining the investment gap that firms perceive in their activity. Then, we focus on possible asymmetric impacts across types of firms or regions of domiciliation. Appendix 1 describes the EIBIS survey and Appendix 2 presents the matching with ORBIS database.

2. Long-term impediments to investment: Evidence from the EIBIS

In order to better understand the barriers that a firm might face in its investments activities, the EIBIS asks European corporations about nine potential obstacles, whether each is a major, a minor or not an impediment at all to investment.[3] The question provides the view of the firms regarding the factors limiting their investment activity in an undefined time horizon and their intensity. The possible limiting factors reflect some classical determinants of the level of investment, such as, demand, uncertainty (Abel and Eberly, 1994), access to finance (Fazzari et al., 1988; Hennessy et al., 2007) and business regulation (Alesina et al., 2005; Acemoglu and Johnson, 2005), but also, other impediments that are covered with less frequency in the literature, such as energy costs or access to digital infrastructure. Given that, they do not refer to a specific time period, the set of questions gives a broad view on the long-term impediments to investment for European companies.[4]

Figure 1 reflects the percentage of European Union firms that perceive each of the long-term obstacles to investment alongside the relative importance attributed to them. As in the rest of the paper, this figure takes into account the companies' responses to the first two waves of the survey available until now (years 2016 and 2017).

Combining obstacles that are reported as a minor or a major one, **Figure 1** shows that uncertainty about the future is clearly the most important limiting impediment, being mentioned by close to 80 % of the companies. Then, by descending order, follow the availability of staff with the right skills, business regulation (e.g. licenses, permits, bankruptcy), and labor regulation; each of those is reported by more than 60 % of the European firms. Energy costs and lack of demand for products and services appear in fifth and sixth position, respectively. They are followed by the availability of finance, which relates to both internal and external financing. Lastly, the factors mentioned by a smaller number of corporations are availability of adequate transport infrastructure and access to digital infrastructure.

If we focus only on the share of companies that mention each obstacle as being a major one to investment, the order in relevance of them remains very similar to the previous one, with two exceptions however: the availability of staff with the right skills becomes the obstacle reported by a highest number of firms and the availability of finance becomes the fifth most important factor.

Across time, the results change marginally over the two waves, although in the latest, the share of corporations reporting most of the obstacles is slightly lower. Given the improvement in the general

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[3] See question 38 of the general module questionnaire.
[4] Firms' responses will, nonetheless, vary from wave to wave according to their perceptions in each moment, as well as the cyclical position of the economy. Besides, part of the population surveyed change across waves.

economic situation recorded over the two waves, this could indicate that firms' perceptions are somewhat influenced by the business cycle.

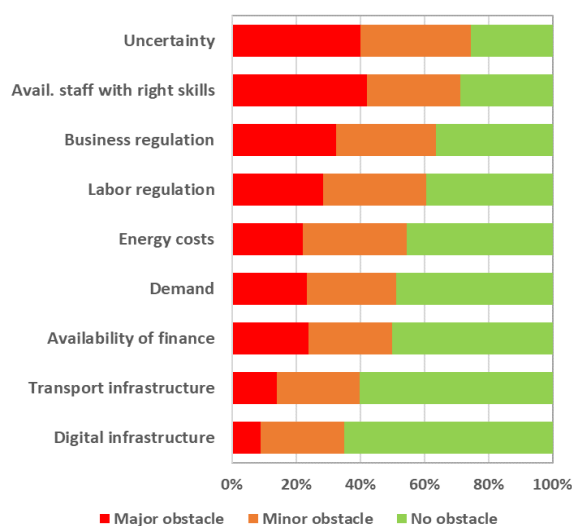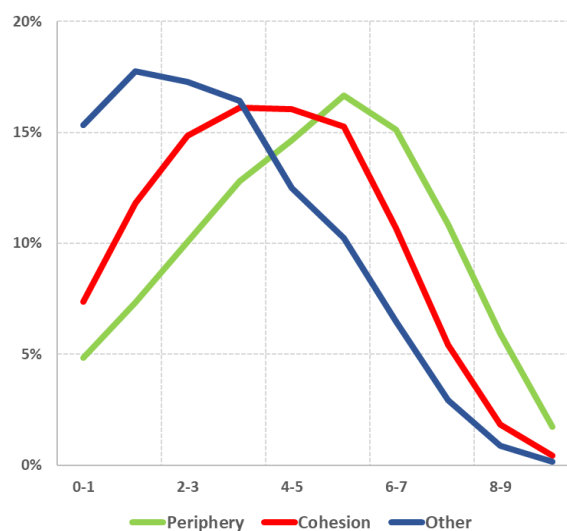**Figure 1**   Obstacles to long-term investment. Detailed answer

Figure 2   Histogram of the number of reported obstacles. Breakdown by region

Source: Authors' calculations based on the EIBIS16 and EIBIS17.

Given that some factors, such as demand, availability of staff, and uncertainty, are pretty much tied to the position in the business cycle, therefore we analyze the answer across countries. For the sake of simplicity, the 28 EU economies are grouped into three sets: Cohesion, which consists of the countries that joined the EU after the enlargement in 2004 and later; Periphery, which is formed by the countries that have experienced a downgrade of, at least, two notches in their rating during the sovereign debt crisis; and Other economies.[5] Over the recent past, these groups of economies have experienced different headwinds. **Figure 2** shows the distribution of the sum of obstacles by region. In this figure, when a company reports an obstacle as being a major one to investment is given a weight of 1, whereas if the impediment is considered to be a minor one the weight assigned is 0.5. Hence, the sum of obstacles varies in the range of zero to nine.

The periphery is clearly tilted towards the right compared to other economies and the cohesion region. This means that the countries that have been hit the most by the economic crisis tend to report a higher number of obstacles (more firms report several impediments), even several years after the end of the sovereign debt crisis. In the periphery, the mode of the distribution is located between five and six obstacles, with this range reported by about 16 % of the corporations. Differently, for other countries, the mode value is located between one and two barriers to investment. Cohesion countries are somewhere in the middle, with the higher proportion of companies reporting between three to five obstacles. Overall, half of the corporates report more than five obstacles in the periphery, compared with four in the cohesion and three in the other economies.

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[5] **Cohesion countries include:** Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia. **Periphery countries include**: Cyprus, Greece, Ireland, Italy, Portugal and Spain. **Other countries include**: Austria, Belgium, Denmark, Finland, France, Germany, Luxembourg, the Netherlands, Sweden and the United Kingdom. In 2017, cohesion, periphery and other economies accounted for respectively 8, 23 and 69 % of EU GDP.

One would expect some degree of correlation among the impediments reported, as some obstacles may be linked by nature. For instance, business regulation tends to develop with labor regulation. Also, if a corporation perceives a lack of demand, then it is quite possible that the same firm will also report a high level of uncertainty about the future, given that the link between demand and uncertainty (Bloom, 2009). Besides, the company' profile will clearly affect the impediments observed: a firm that is labor-intensive is more likely to report lack of staff with the right skills and at the same time claim that the labor market regulation is an obstacle to investment.

Table 1 reports the correlation matrix among the nine obstacles. It shows that the correlation is always positive and, in general, relatively high. The relationship is the strongest between labor and business regulation (53 %), given that both obstacles capture dimensions of the regulatory framework of a country and hence co-move. Conversely, correlation is weakest between uncertainty and availability of staff with the right skills (18 %).

Table 1   Correlation between reported obstacles (in percentage).

	Uncertainty	Skills	Business	Labor	Energy	Demand	Finance	Transport	Digital
Uncertainty		17.8	35.3	32.9	37.2	32.2	37.1	28.7	27.8
Skills	17.8		26.2	32.9	26.8	30.3	19.3	27.3	31.6
Business	35.3	26.2		53.2	25.5	37.7	30.0	38.0	33.2
Labor	32.9	32.9	53.2		24.2	38.0	28.0	36.2	37.5
Energy	32.2	30.3	37.7	38.0		30.4	30.5	38.9	39.5
Demand	37.2	26.8	25.5	24.2	30.4		35.8	32.5	30.2
Finance	37.1	19.3	30.0	28.0	35.8	30.5		33.3	30.8
Transport	28.7	27.3	38.0	36.2	32.5	38.9	33.3		41.4
Digital	27.8	31.6	33.2	37.5	30.2	39.5	30.8	41.4	

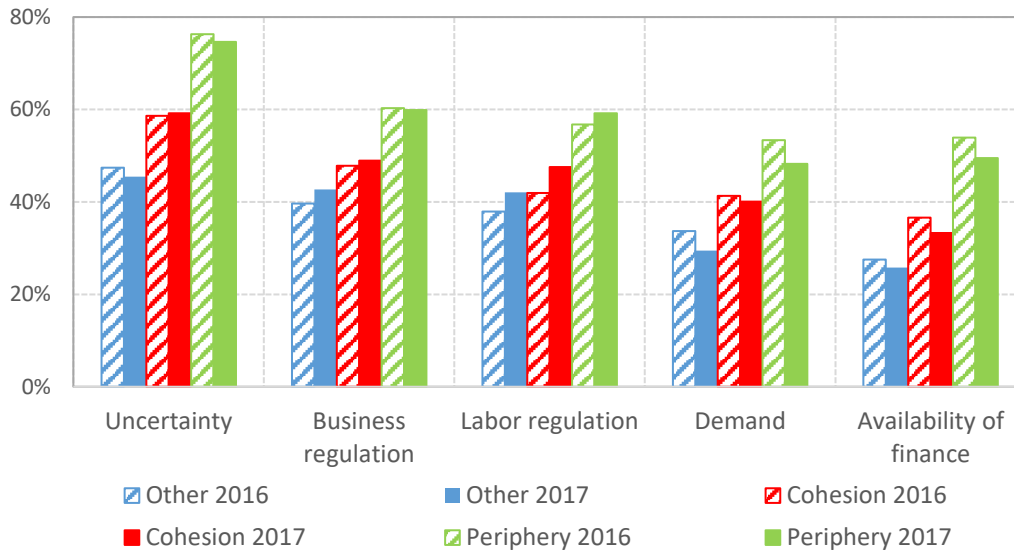*Source:* Authors' calculations based on EIBIS16 and EIBIS17.
Note: EU wide results. The color of the cells indicate the magnitude of the correlation. Dark green, green and light green reflect correlations above 50 %, 35 % and 20 % respectively.

By definition, some factors contemplated as potential obstacles to investment are very specific, and presumably do not affect all firms. For instance, availability of transport and digital infrastructure, energy costs and staff with adequate skills, are likely to matter differently across sectors: Energy costs may be more of a source of concern for industrial corporations than in the services. Adequate transport are less relevant in the services industry, apart from the transportation sub-sector, while digital infrastructure will matter more, especially compared to the construction sector. According to **Table 1**, transport, digital and energy obstacles are quite correlated among themselves: correlations between transport and digital infrastructure amounts to 41 % and correlation between energy costs and digital infrastructure amounts to 40 %. Those elevated correlations may reflect the level of development of the county or the social choices towards public goods, as more developed economies tend to have better infrastructure. Staff with the right skills is the impediment that shows the lowest relation with any other.

Alleviating investment impediments arising from skills, energy, transport and digital infrastructure require specific or sectorial policies, targeted interventions, as they do not reflect the macroeconomic environment and are likely to be perceived asymmetrically among corporations. Indeed, these barriers are not correlated with other barriers of a more general nature, such as demand, uncertainty, regulation and access to finance. Conversely, access to financing, lack of demand, the level of uncertainty and the regulatory framework (both for business and labor) are economic wide and are

likely to affect all the corporations, albeit to a different extent. In the rest of this study, we focus on these five obstacles, as they can be addressed with the macroeconomic or competition policy toolkit. **Figure 3** breaks down the EU sample among the three regions already considered to show the proportion of firms reporting each obstacle, one-by-one.

Figure 3   Weighted proportion of firms reporting an obstacle. Breakdown by region.

Source: Authors' calculations based on EIBIS16 and EIBIS17.
Note: The weighted proportion of firms reporting each obstacle is constructed as follows: if an obstacle is reported as a major obstacle, it is given a weight of one, whereas if it is reported as a minor obstacle, its weight is 0.5.

The conclusions obtained for each obstacles separately comfort those reached for the sum of obstacles: each impediment, independently of its nature, is reported by a higher proportion of firms in the periphery than in the cohesion. In all the cases, the proportion is above the one recorded in the other economies. Interestingly, the ranking of impediments is similar across regions and over the two waves: uncertainty is the most reported impediment, with also a noticeable difference between the periphery, where it is reported by around 75 % of corporations, and less in the other economies, where it is reported by 50 % of firms. Labor regulation and business regulations are next, in a very narrow range. They are reported in each region and each year with a very similar proportion. Then demand follows. Availability of finance is the least reported, but with a wide gap between the other economies (around 23 % on average) and the periphery (about 51 % on average).

For almost each impediment and each group, the proportion decreases from 2016 to 2017. The improvement is relatively modest overall, but somewhat stronger for the availability of finance and demand, especially in the periphery. Indeed, differences across time are much less pronounced than differences across regions.

We have drawn some stylized facts regarding the impediments to investment across time and regions. Now, we illustrate how each of the five impediments is tied to an investment channel, traditionally captured through macroeconomic indicators. We show that, across countries, the survey-based indicator correlates rather well with the macroeconomic indicators traditionally used.

3. Illustrating the main investment channels

The use of granular data to provide information on impediments to investment is an interesting feature of the EIBIS, especially since those can be associated with firms' characteristics at the individual level. Each of the impediments considered in the paper illustrates a channel developed in the literature on investment, the intensity of which can be then estimated at the granular level assuming that the survey-based measures reflects the macroeconomic counterpart. In turn, macroeconomic proxies have been constructed to provide information on the intensity of the channel. Taking each impediment one after the other, we show what the channel illustrates and how it compares with its macroeconomic counterpart. For each impediment, we correlate a measure obtained by aggregating across corporations of each country, with an objective economy-wide measure. We thereby show that the question related to impediment provide a granular counterpart to more traditional measures based on hard data. This supports the use of the survey answer as an alternative measure upon which cross-sectional analysis can be conducted.

3.1. Economic activity and growth opportunities

The role of economic activity and growth opportunities in determining investment has been corroborated by numerous theoretical and empirical studies.[6] In a standard neoclassical model with perfectly competitive markets and no informational frictions, investment will only be a function of Tobin's q,[7] adjusted for the relative prices of investment goods and the tax rates. In turn, Tobin´s q highlights the role played by growth opportunities and the user cost of capital.[8] The Keynesian approach to investment puts more emphasis on the role of demand expectations and the way agents form these expectations. Investment decisions are driven by firms' expectations about future profitability (Keynes, 1936). The Tobin's q has been extensively used to predict investment spending and to control for firms' current and future profitability in empirical studies of corporate behavior (Tobin, 1969; Hayashi, 1982; Erickson and Whited, 2000).

Figure 4 shows that, across countries, the share of firms reporting the lack of demand as an obstacle (either major or minor) to investment correlates negatively quite well (reaching 37 %) with the average output gap recorded in the years prior to the survey (period 2013-2016). A smaller output gap, which reflects less slack and stronger demand in the economy, is accompanied by a smaller proportion of corporations reporting demand as an impediment to their investment plans. **Figure 4** also shows that there are important differences across groups of countries. Countries in the periphery, cohesion and other regions are plotted in green, red and blue, respectively.[9] Most of the countries included in the periphery are located in the upper left part of the chart, which means that they tend to have a more negative output gap as well as more firms perceiving a lack of demand. Conversely, countries from the other region are located in the lower right part of the figure.

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[6] See Oliner et al. (1995) for an empirical survey of the literature.
[7] The Tobin's q is defined as the ratio between the market value of a firm and the replacement cost of its assets. This statistic depends on the firm's profitability and the financial market's required rate of return.
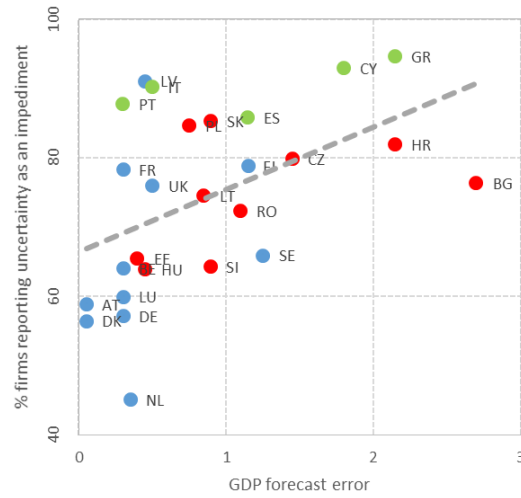[8] See Caballero (1999) for an excellent survey of the theoretical literature.
[9] The same signalling colours are used in the following figures.

Figure 4 Proportion of firms reporting a demand obstacle and output gap
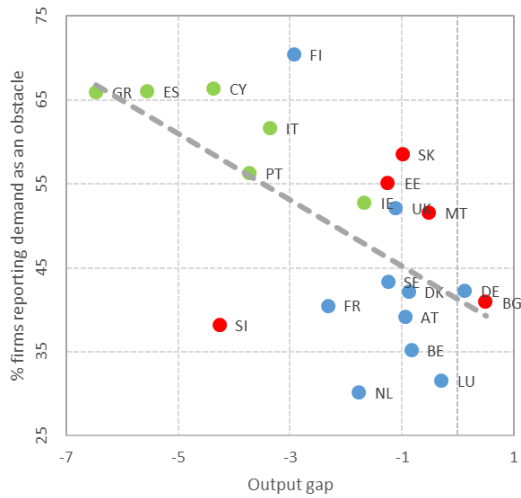
Figure 5 Proportion of firms reporting an uncertainty obstacle and Average Forecast Error

3.2. Uncertainty

Another branch of the literature highlights the role of uncertainty as an additional relevant determinant of investment. Uncertainty may affect investment through different channels. According to the real option theory, as long as investment projects are (even partially) irreversible, uncertainty shocks may increase firms' incentives to delay investment until some of the uncertainty resolves. This generates the so-called "wait-and-see" effect, which affects both the timing and the level of investment.[10] On the other hand, some authors highlight the role of financial distortions as the most relevant mechanism through which uncertainty materializes. Arguably, periods of higher uncertainty may exacerbate the consequences of financial frictions and credit tightness.[11]

An empirical validation of the adverse effects of uncertainty appears challenging, as there is no consensual measure of uncertainty. Different authors propose different ways to measure uncertainty with the aim to study the impact of aggregate uncertainty on macroeconomic dynamics.[12] Only few studies consider the impact of uncertainty on investment using firm level data. Julio and Yook (2012) find a negative effect of political uncertainty on corporate investment for a large panel of countries considering election dates as a source of exogenous variation of uncertainty. Using the Economic Policy Uncertainty index developed by Baker et al. (2014), Gulen and Ion (2016) and Baker et al. (2016) assess the impact of policy uncertainty on US corporate investment. They find a negative average effect which is further amplified for firms undertaking investment projects which are more irreversible, as one would expect according with the wait-and-see channel. In a similar vein, the work of Dejuan and Guirelli (2018) investigates the role of policy aggregate uncertainty on investment for the case of Spain using firm level data. The authors find evidence that policy uncertainty reduces the corporate investment rate. In addition, they show that firms with in a worse financial situation are

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[10] See, among others, Bernanke (1983), Pindyck (1991), Bertola and Caballero (1994) and Abel and Eberly (1994).

[11] See Gilchrist et al. (2014), Christiano et al. (2014) and Arellano et al. (2016).

[12] See Bloom (2009), Bachmann et al. (2013), Jurado et al. (2015), Basu and Bundick (2017).

more affected by uncertainty. Their results are consistent with the financial friction channel developed below.

As a measure of uncertainty, we use the forecast error on GDP in 2016 and 2017, based on the European Commission economic projections released in autumn of the preceding year. For each year, we take the absolute difference between forecasts made in autumn of the previous year and the actual GDP growth rate. The results are shown in **Figure 5**. There is indeed a positive correlation between the macroeconomic measure of uncertainty and the survey-based measure, amounting to 28 %. Across countries, the higher the share of firms reporting uncertainty as an impediment, the lower the ability to forecast. The positive correlation gives credit to the survey-based measure of uncertainty.

3.3. Financial frictions

Modigliani-Miller's theorem (1958) established the basis of the modern thinking about the capital structure of a firm. The theorem states that in an efficient market, and in the absence of taxes, bankruptcy costs, agency costs, and asymmetric information, the value of a firm is unaffected by how that firm is financed, so that its liability structure is irrelevant. Since then, scholars have recognized that frictions in capital markets make the financing structure an important determinant of corporate investment. Firms make investment decisions subject to not only expected profit determinants (demand and prices) but also to a full range of choices regarding their capital structure, internal funds and debt and equity financing, where external funds are costly owing to agency problems in financial markets. Indeed, the conditions through which they access external funds matter for their investment decisions.

Empirical evidence suggest a significant role of financial frictions explaining investment dynamics. At the macroeconomic level, different methodologies have been proposed to estimate financial conditions and provide a structural identification to analyze the drivers behind their variations (Gilchrist et al., 2014, Darracq-Parriès et al., 2014, Maurin et al. 2018). At the microeconomic level, the seminal work of Fazzari et al. (1988) provides evidence that financial constraints have a significant effect on investment through the cost of raising external finance. Since then, there exists a large body of the literature looking at the sensitivity of investment to firms' internal funds while controlling for investment opportunities as proxied by Tobin's q.[13] In spite of the widely accepted motivation of these studies, disentangling causality remains controversial and unresolved. Furthermore, the work of Kaplan and Zingales (2000) opened a debate on whether the sensitivity of investment to cash-flows is a reliable measure of the severity of financing constraints. Cash-flows may appear to be associated with investment because of measurement errors in average Tobin's q, which is an imperfect proxy of marginal q.

Other papers rely on survey data to assess the effect of financial constraints on real variables.[14] The key advantage here is that, even if financial frictions are not observable, questions to firms about their problems when accessing credit provide a way to construct direct measures of financial constraints.

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[13] In a similar vein, other authors study whether firms' specific characteristics that determine credit-worthiness and access to finance, namely, the firm balance sheet structure, the debt burden and the profitability ratio, will affect investment decisions through the credit channel. See, among others, the work of Bond and Meguir (1994), Estrada and Vallés (1998), Hennessy et al. (2007) and Herranz and Martínez-Carrascal (2017).

[14] See Beck et al. (2005), Campello et al. (2010), Ferrando and Mulier (2013), Coluzzi et al. (2009), García-Posada (2018).

We compile a finance constraint indicator based on the EIBIS. A firm is financially constrained if any of the following situations occur: its loan applications were rejected, it has only been granted a portion of the funds requested, the loan was extended but at a cost that it considers to be too high and the company did not apply for external financing because it thought it would be turned down. The

Figure 6 Proportion of firms reporting a finance obstacle and proportion of finance constrained firms
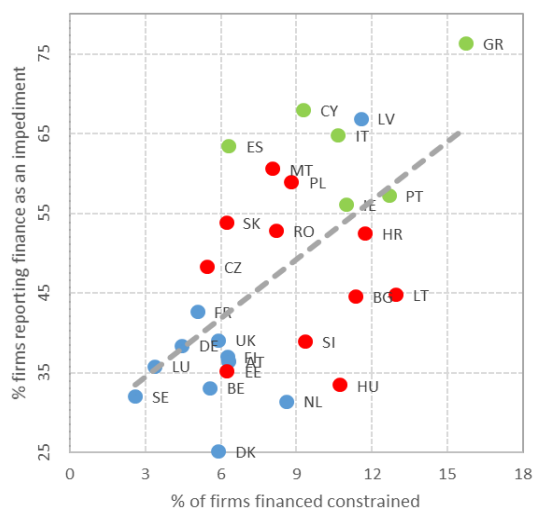
Source: EIBIS16, EIBIS17 and IMF WEO database.
Note: The proportion of finance-constrained firms (x-axis) is derived from the EIBIS survey. See main text for the construction of the indicator.

indicator, constructed for each firm can be aggregated to provide a proportion of firms financially constrained. This provides an objective measure of the degree of finance constrains at the country level.

In **Figure 6**, we correlate this measure, by country, with the share of firms reporting finance as a long-term impediment, a more subjective measure. The two indicators correlate positively, with a correlation amounting to 34 %. Therefore, the least financially constrained a company is, the least likely is that it will report availability of finance as an obstacle. By regions, as expected, other economies are concentrated in low percentage of firms being financially constrained and low levels of corporations claiming finance as an impediment, while the rest of the countries are distributed along this relationship.

3.4. Regulation, taxation and judicial system efficiency

Regulation, taxation and the judicial system efficacy may also affect investment decisions. Policy makers highlight that structural policies aimed at improving the regulatory environment, reducing barriers of entry for firms and increasing the overall flexibility of labor and product markets are investment enhancing measures (ECB, 2016).

The regulatory environment may affect investment decisions in different ways. First, it may have a direct effect on capital adjustment costs. As suggested by Alesina et al. (2005), red tape costs and other administrative impediments imply costs of doing business. Their stylized theoretical framework allow to underpin a positive effect of a decrease in the cost of firms to adjust their capacity on investment. Second, barriers to entry will affect the number of firms in a given market, which may in turn impact the optimal capital stock and consequent investment flows. Using an indicator of entry barriers which comprises legal restrictions and vertical integration, Alesina et al. (2005) estimate a dynamic model of investment. Their findings suggest a negative relationship between barriers to entry and investment. In addition to this, Beck et al. (2005) analyze the impact of financial, legal and corruption obstacles on firms' growth using a cross section survey conducted by the World Bank.[15]

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[15] World Business Environment Survey.

They find a negative correlation between the considered obstacles and firms' growth. Furthermore, the magnitude of the effect is found to be higher for smaller firms.

Finally, investment is sensitive to the quality of the institutional framework, which comprises both regulations and enforcement institutions. More specifically, investment contracts may be subject to default risks due to holdup problems arising from the potential irreversibility and specificity of investment decisions. Therefore, a stable framework of relationships between companies' needs mechanisms that guarantee the enforcement of contracts, such as the judicial system. The seminal paper of Acemoglu and Johnson (2005) evaluate the importance of "property rights institutions" and "contracting institutions" in affecting economic growth, investment and financial development. Their findings points to an important role of different proxies of property rights institutions and contracting institutions on the investment to GDP ratio for a large panel of developed and developing countries . In addition, García-Posada and Mora-Sanguinetti (2014) focus on the role of the design and efficacy of enforcement institutions (judicial system) on firms' entry and exit rates. They find that higher judicial efficacy increases firms' entry rate, whereas no effect seems to be present for the case of the exit rate. Overall, the existing evidence seems to suggest that a well-functioning judicial system is essential create the appropriate environment for investment decisions to take place.

Figure 7   Proportion of firms reporting a business **Figure 8** Proportion of firms reporting a labor market
obstacle and Product Market Regulation   obstacle and Strictness of Employment Protection
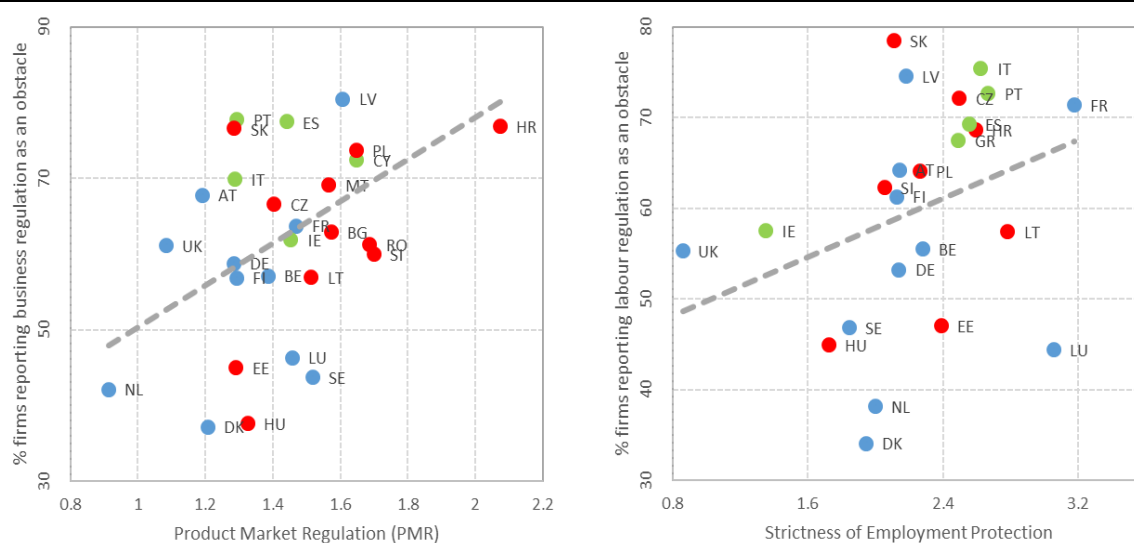
Source: EIBIS16, EIBIS17 and OECD.
Note: A higher value of the index indicates stronger employment protection (lhs) and more stringent product market regulation (rhs).

Figure 7 and **Figure 8** shows the relation between measures of the intensity of the regulatory framework elaborated by OECD and the share of firms in each country that report regulation as an impediment. On the one hand, in **Figure 7**, business regulation is correlated with Product Market Regulation index. The latter is a comprehensive and internationally-comparable indicator that measures the degree to which policies promote or inhibit competition in areas of the product market. On the other hand, in **Figure 8**, labor market regulation from the survey is correlated with the Strictness of Employment Protection index, which measures the procedures and costs involved in dismissing individuals or groups of workers and the procedures involved in hiring workers on fixed-term or temporary work agency contracts.

In both figures, the correlation is positive, as the trend line is upward sloped. It is somewhat steeper and more intense (R-squared 22 %) in the case of the business obstacle than in the labor market one (R-squared 12 %). Therefore, as firms develop their activities in an environment where the regulatory pressure that is high, then they are more likely to feel that regulation (either of the labor market or of businesses in general) is an obstacle to their investment. Both figures also illustrate that, in the case of regulation, there is no clear differences by group of countries, as it happened in the obstacles of demand and finance.

4. Characterizing the firms that report obstacles to investment

In the previous section, we have provided evidence that the survey answers received from corporations are indeed linked to a more objective measure of what the question intends to reflect. At the aggregated level, across countries, this association between hard data, based on measurements, and soft data, based on survey answers, suggest that later also provides an objective signal. We now turn to the subjective part of the individual answers. We show that to some extent, perceptions of firms reflect or are also influenced by their own characteristics.

In the first step, we estimate a cross sectional regression, equation (1). We project the sum of the obstacles reported by each firm on a set of characteristics. Each firm can report between 0 and 5 obstacles. The two vintages of the EIBIS are stacked so that firms and years are compacted. They are treated as one observation *i* reflecting both a firm and a reporting year.

$$\sum impediment_i \qquad\qquad (1)$$
$$= \alpha_c + \alpha_t + \beta_1 \cdot prof_i + \beta_2 \cdot indebt_i + \beta_3 \cdot liquid_i + \beta_4 \cdot size_i$$
$$+ \ sector \ and \ age \ dummies + \varepsilon_i$$

Where α_c and α_t denote country and time dummies; *prof* refers to profitability ratio, measured as benefits before interest and taxes to total assets; *indebt* is the indebtedness ratio, measured as interest-bearing debt to total assets; *liquid* is the liquidity ratio, measured as cash equivalents to total assets; and *size* is defined as the log of total assets. The equation also incorporates sector and age dummies. Age is a binary variables that takes the value of one if the firm has been operating for less than ten years.

The distribution of the variables derived from balance sheet or P&L is plotted in Appendix 2. Substantial differences can be observed across regions: over the period, based on the EIBIS-ORBIS matched sample, firms in the cohesion countries are smaller and tend to be less leveraged. Reflecting the worse economic environment at that time, firms in the periphery tend to have a lower cash ratio and lower returns on assets. To tackle the difference across regions, equation 1 is estimated on EU corporates altogether as well distinguishing them, for periphery, cohesion and other economies separately. Table 2 presents the results.

Table 2   Linear regression model on the number of obstacles reported by a firm

VARIABLES	EU	Periphery	Cohesion	Others
Profitability ratio $_{t-1}$	-0.490***	-0.678	-0.586***	-0.211
Indebtedness ratio $_{t-1}$	0.158***	0.205	0.110***	0.284**
Liquidity ratio $_{t-1}$	-0.387***	-0.191	-0.293*	-0.520*
Size (log of assets)	-0.053***	-0.038**	-0.068***	-0.047*
Young firm (<10 years)	0.016	0.041	-0.009	0.025
Construction sector	0.204***	0.317***	0.267**	0.044
Services sector	0.036	0.058	0.052	-0.001
Infrastructure sector	-0.069	-0.104	-0.137	0.003
Observations	8,402	1,808	3,420	3,174
R-squared	0.178	0.069	0.084	0.095

Sources: Authors' calculations based on EIBIS16, EIBIS17 and ORBIS.
Note: a) The regression is based on EIBIS and ORBIS information for the period 2016-2017. The coefficients are obtained from a linear regression model with country and year fixed effects. The standard errors are corrected and clustered at country level. *, ** and *** indicate significance at confidence levels of 90, 95 and 99 %, respectively.

In all the cases, larger firms report less obstacles, a relation significant at 99 % in the EU and the cohesion, at 95 % in the periphery and at 90 % in the other economies. Young firms tend to report more obstacles, but the difference is not significant at the 90 % threshold. Age is likely to be correlated with size, which is measured as a continuous variable in the regression. Therefore, size may capture the effect better, thereby explaining why age does not appear significantly in the regressions. Corporations that are more profitable tend to report less impediment, as the sign of the coefficient on the profitability ratio is negative. The effect is significant at 99 % for the EU as a whole and the cohesion region. Similarly, firms with a higher liquidity ratio tend to report fewer obstacles. The effect is significant at 99 % in the EU, and 90 % in the cohesion and the other economies. Conversely, firms that are more indebted tend to report more obstacles. The effect is significant at above 95 % everywhere except in the periphery. Across sectors, firms operating in the construction sector tend to report more obstacles. The effect is significant at 90 % in the EU and the periphery, at 95 % in the cohesion, and not significant in the other economies. The fact that some coefficients are not significant in some regions might reflect the relatively small sample size rather than a weak relationship.. With more waves of EIBIS coming up each year, this issue should fade out over time.

Overall, this simple exercise shows that "weaker" firms defined as firms that are smaller, and/or more indebted, and/or less profitable and/or with lower liquidity positions, tend to report more obstacles. Also smaller firms tend to be report more barriers. Finally, everything else being equal, firms in the construction sector tend to report more impediments. The relationships may be interpreted in two different ways. First, they may show degree of endogeneity, as firms tend to be weaker where the economic environment is less favorable. In this sense, weaker firms are precisely the product of lower demand, more uncertainty, more difficulty to access finance, and this is why they might tend to report more impediments. Second, the relationships could also reflect some bias in their assessment of the barriers they actually face.

To analyze further this possibility, we turn in a second step to estimate a probit regression for reporting each impediment separately. In equation (2), reporting an impediment *type* by firm *i* is

explained by a probit model which includes the same dependent variables as in equation 1, profitability, indebtedness, liquidity, size, sector and age dummy. As before, the model includes country and time dummies.

$$impediment_i^{type}$$
$$= probit(\alpha + \beta_1 \cdot prof_i + \beta_2 \cdot indebt_i + \beta_3 \cdot liquid_i + \beta_4 \cdot size_i$$
$$+ sector\ and\ age\ dummies) + \varepsilon_i^{type}$$

(2)

Table 3 reports the average marginal effect of each variable for each of the reported impediments. This corresponds to the change in the probability of reporting an obstacle associated with a unit increase in the explanatory variable when all the variables are at their mean values.

The results are broadly consistent with the conclusions found for the sum of the impediments at the EU level. Higher profitability or liquidity ratios and lower indebtedness ratio tend to reduce the probability that a corporation reports an obstacle to investment independently of its nature. However, the magnitude of the effect varies across types of impediment and it is not always significant even at 90%. In several cases, the differences appear relatively intuitive when looking at the nature of the explanatory variable and the associated type of impediment.

For instance, in absolute terms, the impact of the profitability ratio on the probability to report an impediment is higher for uncertainty, demand and availability of finance for which the sensitivity is highest. Those are impediments of a more cyclical nature, as the profitability indicator. Given their similar nature, it is therefore not surprising that they tend to share a more intense relation. Conversely, the probability of reporting regulation as an impediment is not significantly affected by the profitability ratio. While in specific cases, at the sectoral level and after the change is implemented, a change in regulation is associated with a variation in the profitability ratio, in general and across time, variations in the profitability ratio hardly reflect regulatory changes.

Stronger liquidity ratio also reduces the likelihood of reporting an impediment, especially for the availability of finance, regulation (both business and labor) and uncertainty. In fact liquidity or cash position are likely to act as buffers in uncertain times, so this reduces the likelihood of perceiving uncertainty as an impediment. The relatively stronger relationship between labor regulation and liquidity ratio also appears relatively intuitive. Labor regulation tends to prevent the capacity for corporations to adjust labor demand in the face of an adverse activity shock. Hence, stronger labor market regulation raises the need to hoard liquidity buffers to cover for the wage bill in case of a temporary slowdown. This channel may explain why, other things being equal, lower liquidity ratio increases the likelihood of reporting labor regulation as an obstacle more than that of uncertainty and demand. Besides, higher cash position reassures the lender, as it is associated with reduced liquidity risk. Hence, finance is less of a problem for firms with higher liquidity ratios.

Finally, indebtedness ratio appears to have a significant impact at more than 90% only on the availability of finance. Indeed, the indebtedness of a firm is one of the first signal looked at by the lender when a loan is requested in order to assess the solvency of the company and therefore the credit risk. A higher indebtedness ratio reduces the remaining amount of unencumbered assets that the lender can request as collateral, while it increases the risk of non-payment by raising the interest rate burden.

For most of the impediments, everything else being equal, larger corporations tend to report less obstacles. The effect is significant for labor regulation, that large corporations can tackle more easily, and availability of finance, as larger companies can have access to intra-group funding. Finally, looking at sectors, uncertainty and demand tend to be less reported as impediment by the infrastructure sector. Everything else being equal, firms in the construction sector tend to report more often impediments from the regulatory side, both business and labor. They also tend to report more barrier from the financial side. This probably reflects some legacy stigmas of the most recent economic crisis that was partly resulting from a construction boom in some countries.

Table 3   Average marginal effects of a probability model that a firm will report a given obstacle

VARIABLES	(1) Uncertainty	(2) Demand	(3) Business reg.	(4) Labor reg.	(5) Availab. Finance
Profitability ratio $_{t-1}$	-0.114***	-0.115***	-0.041	-0.054	-0.225***
Indebtedness ratio $_{t-1}$	0.010	-0.019	0.019	0.002	0.206***
Liquidity ratio $_{t-1}$	-0.065*	-0.042	-0.084*	-0.081*	-0.224***
Size (log of assets)	-0.004	0.004	-0.005	-0.013***	-0.019***
Young firm (<10 years)	-0.020	-0.025	0.013	0.013	0.022
Construction sector	0.025	0.018	0.076***	0.030**	0.066***
Services sector	-0.009	-0.002	0.056***	0.013	-0.001
Infrastructure sector	-0.028*	-0.057***	0.016	-0.033*	-0.005
Observations	8,210	8,186	8,258	8,235	8,282
Pseudo R-squared	0.065	0.039	0.060	0.053	0.081

Sources: Authors' estimations based on the EIBIS-ORBIS matched database.
Note: see notes in Table 2.

The results developed in this section show that "weaker" firms defined as firms that are smaller, and/or more indebted, and/or less profitable and/or with lower liquidity positions tend to report more impediments and to report each obstacle more often. At the same time, differences in the frequency of reporting an impediment can be rationalized by the nature of the impediment and what the related variable measures. The role of profitability is higher for reporting finance, uncertainty or demand as impediments. Liquidity matters most for the perception of uncertainty and availability of finance, whereas regulation is a more prevalent impediment for firms in the construction sector.

5. Do reported investment barriers explain investment gaps?

5.1 Interpreting the reported investment gap

The EIBIS entails a question related to the investment gap perceived by the firms in the three years prior to the survey. Corporations are asked if their level of investment over that period was enough to ensure the success of the company going forward (question 24). To this question, the firms can answer "too much", "about the right amount", "too little" or "don't know/refused to answer". In the following exercise, we exclude the firms having refused to answer, score the firms reporting having invested too

little with a one and all the others (those which don't know and those which report having invested the right amount or too much) with a zero. Summing the answers, we can obtain the proportion of firms reporting an investment gap. In the analysis, we condition this proportion on firms´ characteristics.

In **Figure 9**, the proportion of firms reporting having invested too little is shown for the entire EU and the two years, 2016 and 2017. The sample of corporations is broken down and the proportion is conditioned on the sector of activity, age and size of the firm.

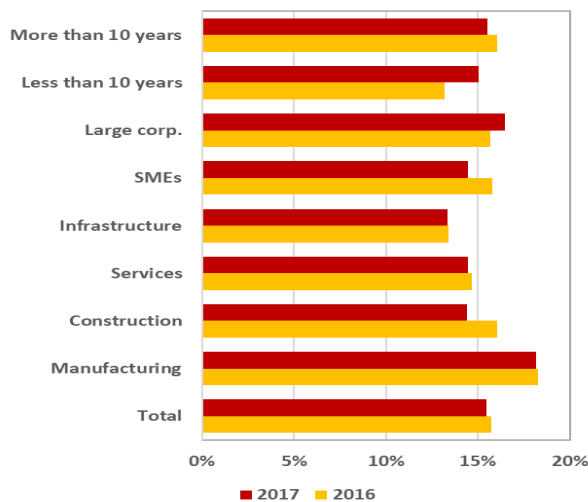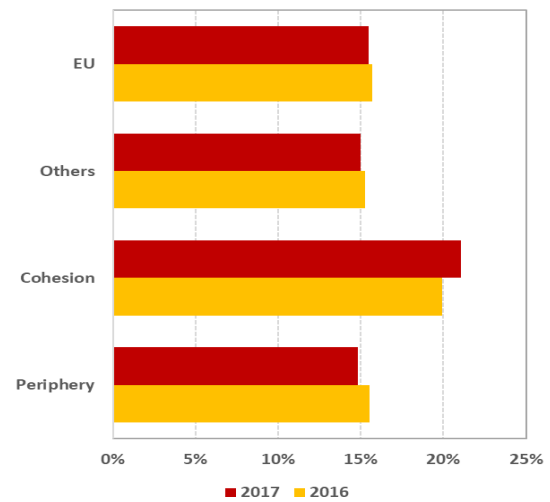**Figure 9** Reported investment gap – comparison across corporations

Figure 10 Reported investment gap – comparison across regions

Source: Authors' calculations based on EIBIS16 and EIBIS17.
Notes: This chart is based on question 24 about the investment gap. It reports the proportion of firms that report an investment gap broken down across several categories.

Over the two years, there is a very moderate decline in the proportion of firms reporting an investment gap, having invested less than what they think they should have done, from 16 % in 2016 to 15 % in 2017. Looking across sectors, a higher proportion of firms report an investment gap in the manufacturing sector and a lower in the infrastructure one. With the proportion ranging from 13 % to 18 %, the differences remain relatively minor in absolute terms, but not in relative terms. From 2016 to 2017, the larger improvement is recorded in the construction sector, where the share of firms reporting a gap declined from 16 % to 14 %. Looking across size, starting with the same proportion in 2016, SMEs tend to report a lower investment gap than large corporations in 2017, a 2 pp difference. Finally, "older" firms, those that have been operating for more than 10 years, consistently report a higher investment gap.

Figure 10 reports the breakdown across regions, for the three country groups. It can be seen that the investment gap is largest in the cohesion, reaching 21 % in 2017, above the EU average of 15 %. Moreover, in this region, the gap widens from 2016 to 2017, albeit marginally, by just 1 pp. Conversely, in the periphery, the gap narrows in 2017 and reaches the EU average. To conclude, along with the recovery in the EU, the gap is reported to have narrowed marginally, affecting 15 % of firms in 2017. There are some differences at the aggregated level, but most of them appear relatively contained, with the exception of the investment gap in cohesion economies.

It is possible to correlate the country bottom-up perceived investment gap and macroeconomic aggregates of slack in the economy. We do so, using on the one hand output gap estimates (**Figure 11**), and on the other hand real GDP growth (**Figure 12**). It appears that the reported investment gap correlates relatively well with both the output gap and GDP growth. The correlation amounts to respectively −52 % and −27 %.[16] Weaker economic activity is associated with a higher investment gap and in a country facing a deeper recession (higher output gap), relatively more firms tend to report an investment gap.

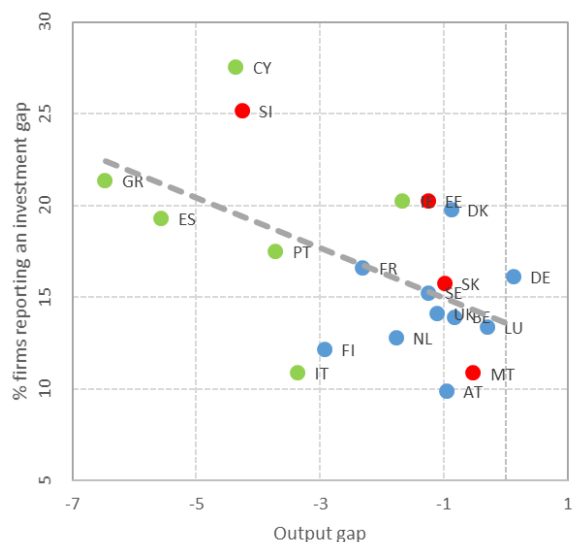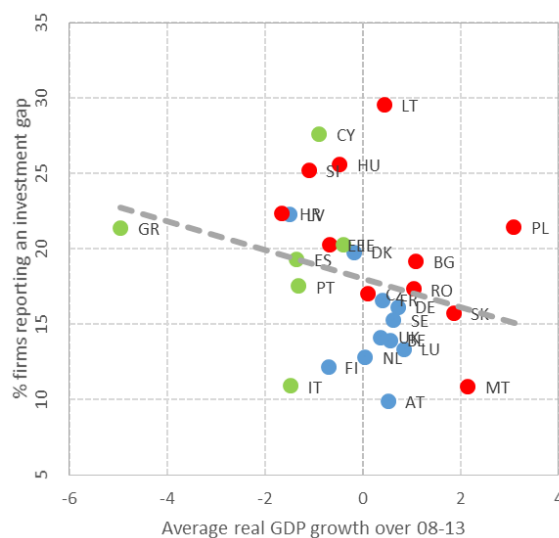| **Figure 11** Investment gap and output gap	**Figure 12** Investment gap and real growth

Interpreting the investment gap can be somewhat difficult and misleading. The appearance of a gap can result from two very different mechanisms and understanding its nature is a pre-requisite to its normative interpretation. On the one hand, a widening can reflect an unexpected acceleration in activity. Ex-post, this results in a gap as the targeted level of investment was underestimated. In this case, the investment gap is positively correlated with surprise in activity and does not reflect impediments/tensions. The targeted level of investment was simply not in line with the economic activity ex post. As such, an investment gap reflects the sluggishness of expectations and the cautious attitude of corporates as much as positive unexpected shocks hitting the economy. On the other hand, an investment gap can reflect the impact of factors preventing investment. Firms are not able to reach the level of investment targeted for various reasons reported as impediments. The EIBIS can contribute to dissociate these two components.

Figure 13 and **Figure 14** provide an illustration of the first channel at the macroeconomic level: an inadequate investment planning in the face of changes in the pace of economic activity. Both figure provides some support for the sluggishness hypothesis, that firms need time to adjust their investment plans to changes in the demand environment. **Figure 13** shows that when growth is higher than expected, firms are more likely to report an investment gap. **Figure 14** also provides evidence of this

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[16] Malta, Ireland and Cyprus, have been affected by very specific events over the period and would appear as outliers on the figures. They are removed from the calculations.

relationship with actual GDP growth: when growth accelerates (slowdown), firms tend to report higher (lower) investment gap. With a R-square of 6%, the intensity of the relationship is weaker than with the unanticipated change in economic activity (for which the R-square reaches 9%). This lower intensity suggests that firms are not myopic, they forecast activity and adjust their investment plan accordingly. Overall, the intensity of the relationship between unanticipated change in activity and investment gap remains weak, explaining up to 9% of the cross-country dispersion. This leaves room for the second channel, exogenous to the firm and linked to its economic, financial and regulatory environment. Nonetheless, it is likely that the relationship intensifies when taking into account forecasts of market activity closer to the firms' actual market, such as sectorial forecast. Unfortunately, such forecasts are not publicly available.

Figure 13   Investment gap and unanticipated change in economic activity

Figure 14   Investment gap and acceleration in economic activity
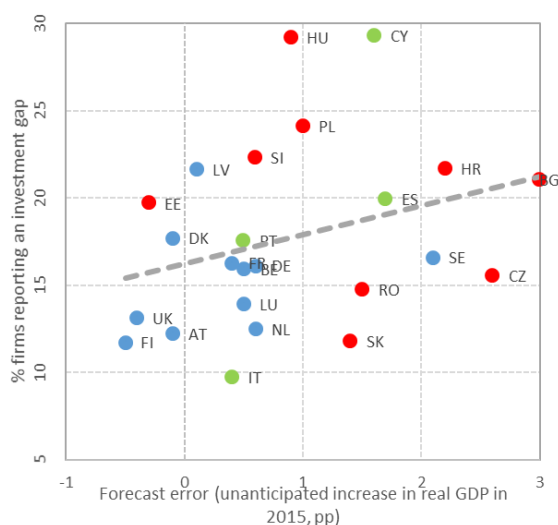
Source: Authors' calculations based on EIBIS16 and EIBIS17, Eurostat and EC. For each economy, the forecast error is computed as the difference between actual GDP growth in 2015 and its forecast in the EC Autumn 2014 projections
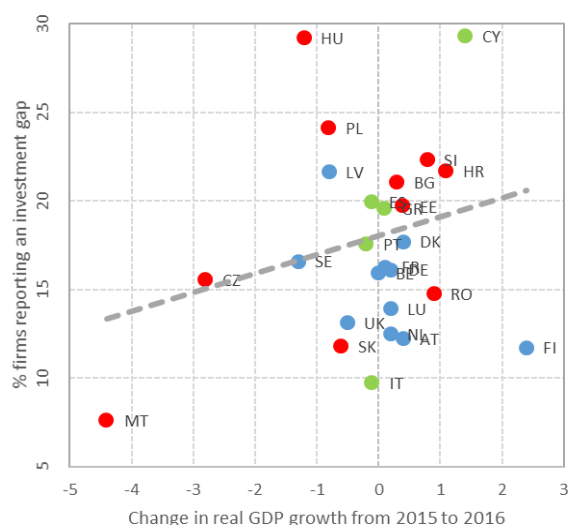
Source: Authors' calculations based on EIBIS16 and EIBIS17 and Eurostat.

5.2 Investment gaps and factors limiting investment: a EU-wide analysis

The question on impediments reported in the EIBIS provides an opportunity to assess the relevance of this mechanism: to which extent investment gaps result from the incapacity of corporates to reach their optimal investment level.[17] In the following, we estimate probit models for the investment gap using information obtained from the question on impediments. The relationship between investment gap and the impediment is tested successively of each type of impediment using the same equation.

As above, the dependent variable, takes the value one if the firm reports having invested too little and zero otherwise (the firms having refused to answer are omitted). The model is similar to the one

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[17] Considering perceived investment gaps instead of actual investment growth enable us to leave aside the issue of determining the optimal investment level. Impediments can also affect the optimal investment level, but this is unobserved.

utilized in the previous section to explain the investment impediments, a static probit model in which the two years of the survey are stacked:

$$gap_i = probit\ (\alpha + \beta_1 \cdot prof_i + \beta_2 \cdot indebt_i + \beta_3 \cdot liquid_i + \beta_4 \cdot size_i \qquad (3)$$
$$+\ sector\ and\ age\ dummies$$
$$+\delta_{min} \cdot dum^{min} + \delta_{maj} \cdot dum^{maj}) + \varepsilon_i$$

Where, as before, *prof* is the profitability ratio, *indebt* is the indebtedness ratio, *liquid* is the liquidity ratio, and *size* is the size expressed as the logarithm of total assets. Part of the structure incorporates the firm's characteristics, balance sheet, P&L as well as qualitative information, such as age and sector. The latter is especially relevant given the asymmetric situation of the construction sector in periphery economies as well as more generally, the different degree of cyclicality across sectors. This part is common to all the equations. Besides, another part of the structure accounts for the reported impediments. Those enter as a dummy and are considered separately depending on their intensity: separate dummies are created for major impediment and minor impediment, respectively dum^{maj} and dum^{min} in the equation. Hence, we interpret the differences in the results with respect to the omitted category: not reporting an obstacle. Two cases are also considered, the case where only the firms specific characteristics are used, and the cases where all the impediments are considered jointly in the same equation.

The results are reported in **Table 4**. The coefficients in the table indicate the average marginal sensitivity, the change in the probability resulting from one-unit change in the explanatory variable, when the others stand at their sample-mean.

In all the estimations, firms' specific hard data have the expected sign. First, an increase in the profitability is associated with a lower investment gap, a relationship which illustrates the relevance of the internal finance channel. Indeed, a large part of investment is financed internally without recourse to external finance (**Figure 15**). When corporations have more internal financing capabilities, they are in a better position to finance investment and therefore tend to have a lower investment gap. In the corporate finance literature, this is called the pecking order. Second, more cash holdings is associated with lower gaps, albeit the effect is not significant. Third, more leveraged companies report tend to show higher gaps. An increase of 10 pp in the indebtedness ratio is associated with an increase in the probability of reporting an investment gap by between 2.8 pp and 5.1 pp. This can be associated to the debt overhang impact on investment: more leveraged firms tend to invest less, especially in times of financial crisis or following a boom cycle (Kalemli-Ozcan et al., 2018). Interestingly, larger firms tend to report lower investment gaps. After conditioning on the balance sheet variables, for the same profitability and balance sheet ratios, a firm which is twice as large, has a lower probability of reporting an investment gap, by between half a pp and 0.9 pp, a small but significant effect.[18] It is worthwhile to note that the average marginal effect computed for the variables common to all the regressions remain robust to the inclusion of the impediment: they remain of the same sign across all the regressions.

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[18] In the estimation, the size is accounted by a continuous variable, the logarithm of total assets. In other results, two groups are considered: SMEs, defined as having between 5 and 250 employees, and large corporations, having more than 250 employees.

**Table 4**   Probit regression of the probability to report an investment gap

	Without impediments	With impediments one by one					All impediments together
Profitability ratio $_{t-1}$	-22.0***	-24.4***	-25.3***	-24.9***	-24.9***	-22.3***	-22.0***
Indebtedness ratio $_{t}$	3.0**	5.0***	4.9***	5.1***	5.1***	2.8**	3.0**
Liquidity ratio $_{t-1}$	-1.6	-4.8	4.8	-4.6	-4.9	-1.4	-1.6
Size	-0.5**	-0.7***	-0.8***	-0.8***	-0.9***	-0.6**	-0.5**
Young firm	-2.7**	-2.2*	-2.4*	-2.4*	-2.3*	-2.8**	-2.7**
Construction	-2.4	-2.0	-2.0	-1.9	-1.7	-2.3	-2.4
Services	-3.4**	-3.4**	-3.6***	-3.5**	-3.4**	-3.3**	-3.4**
Infrastructure	-5.1***	-5.1***	-5.3***	-5.2***	-5.1***	-5.2***	-5.1***
Uncertainty: Minor		1.9*					0.7
Major		6.8***					3.2*
Business: Minor			2.2**				-0.4
Major			4.2***				-0.5
Labour reg.: Minor				2.4***			1.0
Major				5.0***			2.2**
Demand: Minor					1.7*		-0.9
Major					4.0***		-0.5
Finance: Minor						4.1***	3.6***
Major						16.2***	15.1***
Observations	8,204	8,220	8,221	8,220	8,217	8,219	8,204
Pseudo R²		4.90	4.60	4.60	4.50	6.80	7.00

Note: Constant omitted in the Table. Average marginal effects are reported. The dependent variable is expressed in percentage point. We separate the effect of minor and major obstacles by including two different dummies. The omitted category is "no obstacle" and thus, results must be interpreted according to this baseline. For example, reporting a major finance index increases the probability of reporting an investment gap by more than 16 pp.

Turning to the second part of **Table 4**, the part that relates to the impediments, it appears that, in all the cases, even after taking into account their characteristics, the firms that report an impediment to investment, have a higher probability of recording an investment gap. Each of the five impediments considered is significant and correctly signed in the regression. Moreover, an impediment reported as minor increases the probability of reporting a gap, but by less than one reported as major, from twice higher in the case of labor regulation, to four times higher in the case of finance. Across impediments, the effect varies widely, from 1.7 to 4.1 pp for minor impediments and from 4 to 16.2 pp in the case of major one. In both cases, reporting finance as an impediment has the most elevated impact on the gap. When it is major, it increases the probability by 16.2 pp. The relationship remains significant and of a very similar magnitude even after considering all the impediments jointly.

Hence, even after controlling for their balance sheet characteristics, corporations reporting obstacles are more likely to report an investment gap. The most prominent impact is obtained when a corporation reports finance as an obstacle. It reaches 16.2 pp. Reporting uncertainty, labor regulation, business regulation and demand as a major impediment increases the probability of recording a gap by 6.8, 5, 4.2 and 4.2 pp, respectively.

Figure 15 Type of finance for investment (percentage of the total amount)
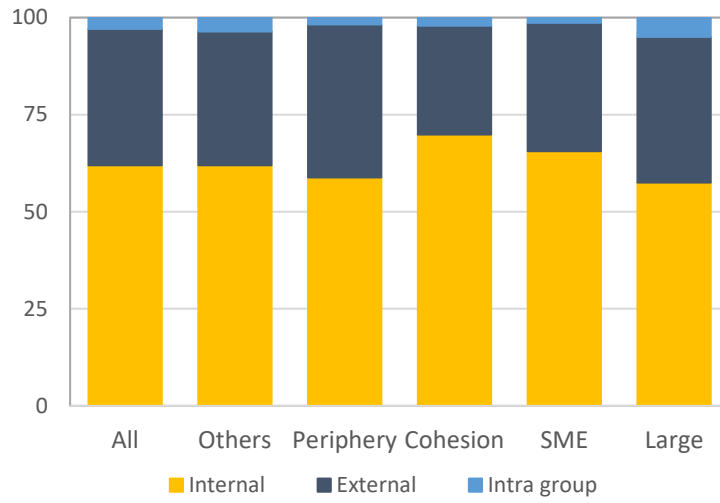
Source: EIBIS16 and EIBIS17.

5.3 Heterogeneous effects

We now turn to the estimation of the marginal increase in the probability of having an investment gap related to the impediment faced on different samples. We allow for differential impact of each obstacle depending on respectively the size of the corporation, the region it belongs to, its indebtedness and profitability. In this estimation, we do not consider separately obstacles being reported as minor or major (they are considered with equal weight):

$$gap_i = probit(\alpha + \beta_1 \cdot prof_i + \beta_2 \cdot indebt_i + \beta_3 \cdot liquid_i + \beta_4 \cdot size_i \qquad (4)$$
$$+ \; sector \; and \; age \; dummies$$
$$+ \delta_{group} \cdot dum^{group} + \delta_{obs} \cdot dum^{obs} + \delta_{inter} \cdot dum^{group} \cdot dum^{obs}) + \varepsilon_i$$

Where:

$$dum^{group} = 1 \; if \; firm \; belongs \; to \; the \; group \; considered, \; 0 \; otherwise$$

$$dum^{obs} = 1 \; if \; firm \; reports \; a \; minor \; or \; major \; obstacle, 0 \; otherwise$$

The group dummy reflects the group of the corporations, for instance, whether it is highly indebted or not. The obstacle dummy (dum^obs in equation 4) is defined as before: it takes value 1 if the firms reports a minor or major obstacle and zero otherwise. Finally, the inclusion of the interaction term implies that we are allowing for differential effects of the different obstacles on the score function depending on the considered group.

The groupings and related estimations are conducted for the size, regions, indebtedness and profitability. The results are reported in **Figure 16** to **Figure 19**. In each figure, for each impediment, the bar indicates the average marginal effect of reporting an obstacle for each of the considered groups. The vertical range indicates the confidence interval at 95 %.

Figure 16 Average marginal effect for each obstacle across region (percentage points, pp)
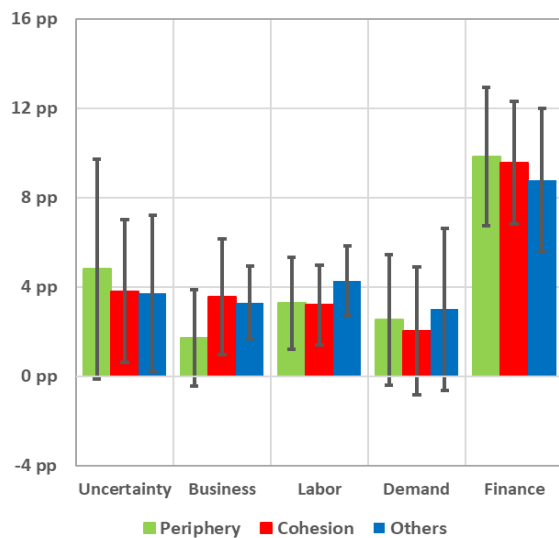
Figure 17 Average marginal effect for each obstacle conditioned on the size (percentage points, pp)

Source: Authors´ estimations based on equation (4).
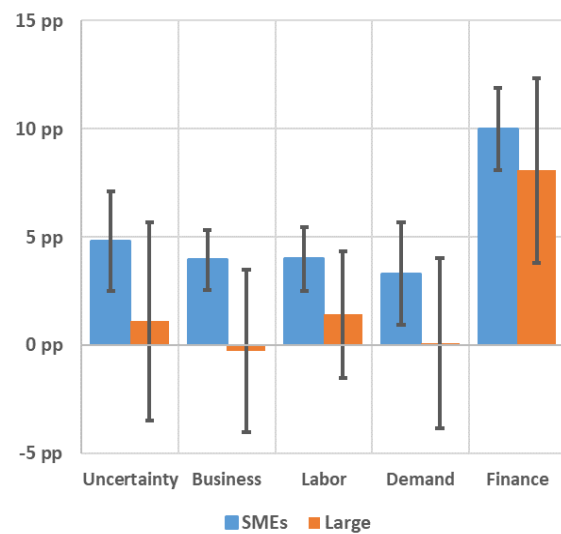
Source: Authors' estimations based on equation (4).
Note: consistently with the literature, SMEs are defined as having between 5 and 250 employees. Large enterprises have more than 250 employees.

For example, consider the column "Uncertainty" in **Figure 17**. The blue bar depicts the average marginal effect of reporting the uncertainty obstacle on the investment gap for SMEs. The orange line represents the effect for the case of large corporations. The vertical line reports the confidence interval at 95 %. If a confidence interval includes the zero then we can conclude that the effect for the considered group is not significant.

Looking across regions, when reporting uncertainty or finance as an obstacle, firms in the periphery are more likely to record an investment gap than firms in the cohesion or the other economies. However, the differences in the average marginal effect remain very small and not statistically significant. This indicates that the geographic dimension is not, over the period, the most discriminant for the relation between uncertainty and investment gap. Reporting uncertainty as an impediment has an effect on recording an investment gap which is relatively symmetric across regions. This is true for all the impediments: when reported, they are associated with a higher investment gap. The intensity of the relationship varies very little across regions.

Conversely, the probability of reporting an investment gap increases significantly and independently from the nature of the impediment, for small compared to large enterprises (**Figure 17**), for the most indebted enterprises (**Figure 18**) and the least profitable (**Figure 19**). The average effects are aligned with those found when using the variable in the regression and not to group the corporations. They differ widely across groups. They are more pronounced when the explanatory variable reaches the higher part of the distribution. On average, firms reporting an obstacle to investment are likely to report an investment gap. The more indebted, smaller or least profitable they are, the stronger is the intensity of the signal received.

Looking across the impediments, reporting finance as an obstacle has the strongest signal, well above the other four types of obstacles considered. It is significant in all the cases for the two groups isolated and stronger for the "weakest" firms.

Interestingly, focusing on the size only, while when smaller enterprises report an impediment, they are also more likely to have an investment gap, for larger ones, this is not the case. Large firms reporting an impediment do not have a significant higher probability of having an investment gap. This is true for each impediment, but finance (**Figure 18**). This may suggest that large enterprises are able to cope with the impediments reported, while, conversely, SMEs are in a weaker position and more likely to suffer from the gap they report.

Taken together, these results indicate that, beyond the balance sheet and P&L characteristics of the company, the size of an enterprise is the most discriminant dimension affecting the relation between the perceived obstacle and the investment gap. The smaller the corporation, the larger the effect of an obstacle on investment.

Figure 18   Average marginal effect for each obstacle conditioned on the profitability

Figure 19   Average marginal effect for each obstacle conditioned on indebtedness
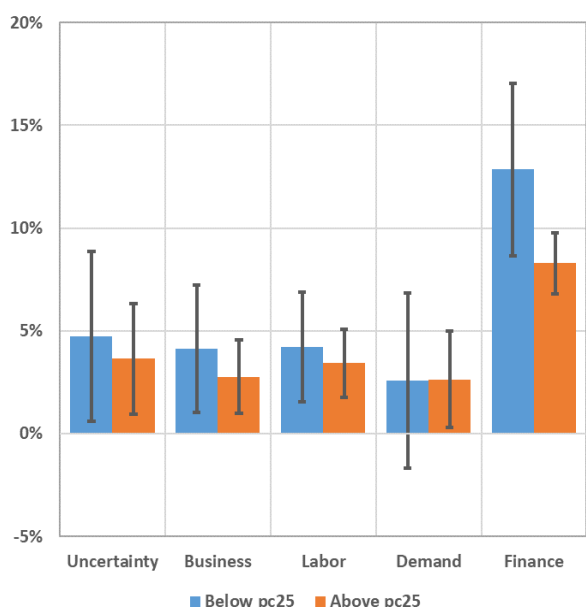
Source: Authors' estimations based on equation (4).
Note: Highly (low) profitable enterprises are those with a profit ratio in the last (first) quartile of the distribution.
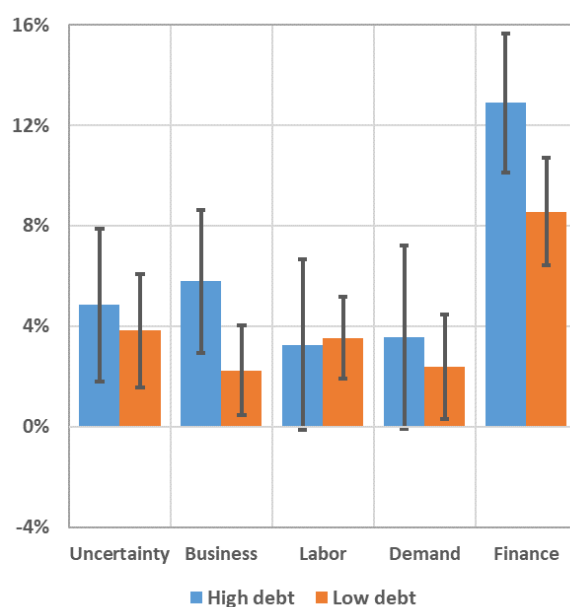
Source: Authors' estimations based on equation (4).
Note: Highly (low) indebted enterprises are those with a debt ratio in the last (first) quartile of the distribution.

6. Concluding remarks

In this paper, we have exploited a database matching the EIBIS with hard data from balance sheet and P&L information. The EIBIS provides a way to illustrate the major investment channels, as firms report impediments to investment resulting from demand, uncertainty, finance and regulation, both business and labor. Our analysis has exploited information about firms´ characteristics and impediments to investment to analyze the investment gap. Linking firms' investment gap with firms' impediments to investment, while controlling for firms´ characteristic, we have provided novel evidence on the relative importance that different obstacles may have in explaining the investment gap that firms report to experience in their recent activity.

The main findings of the paper are threefold. First, we show that survey-based measures provide a reliable source of the channels mentioned as they correlate rather well with macro-based hard data compiled at the country level. Hence, signals for non-financial corporate investment received from the survey can be extracted. Second, we show that "weaker" firms defined as firms that are smaller, and/or more indebted, and/or less profitable and/or with lower liquidity positions, tend to report more impediments   tend to report more impediments. Whether this reflects the endogeneity of the firm to its environment or some bias in the perceptions is left to further research. Third, we show that, controlling for the firms characteristics, reporting an impediment provides a signal for investment. Firms reporting impediments are more likely to report an investment gap, with a stronger magnitude when the impediment is reported as major. The signal intensifies when it is given by "weaker" firms. As we do not find such dependency on the region, our results do not support that corporations located in the periphery continue to be discriminated for systemic reasons years after the end of the crisis.

From a policy point of view, our findings suggest that survey-based information can be a useful input to complement hard data, both macro and micro, and better inform the design of targeted policies to support investment.

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Annex 1 – The European Investment Bank Investment Survey (EIBIS)

The EIB Group Survey on Investment and Investment Finance (EIBIS) is an annual survey of around 12,500 European non-financial corporations conducted since 2016. Corporations of each European country are asked to answer around 55 questions with the aim to better understand the drivers and constraints of investment decisions. The sample is drawn to provide a good representation of the non-financial corporate sector of the European economy in terms of country, sector, size and age.[19] It is designed to build a panel of enterprise data so as to follow firms over time. Overall, in each EU country, between 300 and 600 corporations are surveyed each year, among which around 60 % are new and 40 % belong to the panel group. The analysis developed in this paper is mostly based on the results from the first two waves of this survey (2016 and 2017) as the third wave was not yet released at the time of the work conducted in the paper.

The EIBIS recoups four main blocks of questions, both qualitative and quantitative:

1. The survey collects data on firm characteristics and investment performance, specifying, among other things, the firms' sector group level (manufacturing, services, construction and infrastructure) and size classes (micro, small, medium and large).

2. The survey offers detailed information about past investment activities and future plans. *On the one hand, firms are asked about their past decision* to invest and the intensity of investment. Several questions relate to the composition of investment in use/nature/purpose. It is worthwhile to note that these questions allow for a good characterization of investment in intangible assets, well beyond the limited definition that can be typically derived from balance sheet firm level data. *On the other hand, firms are asked about their investment plans and needs*. In particular, firms report the presence or absence of a perceived investment gap, defined as a relationship between the investment level and the investment that ensure the success of their business going forward.[20] This set of information provides novel evidence about the existence of suboptimal investment decisions and can potentially indicates the need for policy actions.

3. The survey contains a block related to the perception of potential obstacles to investment. This block is widely exploited in the main text.

4. The survey provides relevant information about investment finance, covering aspects such as the source of finance (external, internal and intra-group), the type of external finance used for investment activities and a battery of questions that allows to characterize whether firms are finance constrained.

Overall, our data compiles novel qualitative information and provides a unique and suitable framework to get a better understanding of the drivers and constraints of investment decisions in European countries. Furthermore, its granularity allows for the inspection of potential heterogeneous effects of such drivers and constraints among corporations with different characteristics.

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[19] The questionnaire is available at http://www.eib.org/attachments/eibis_general_module_questionnaire_2016_en.pdf. Minor changes were made to it in the 2017 wave, but the structure remains the same. The methodology of the EIBIS survey is available at http://www.eib.org/attachments/eibis_methodology_report_2017_en.pdf

[20] This information is based on question 24 of the EIBIS survey. Firms are asked: "*Looking back at your investment over the last three years, was it too much, too little, or about the right amount to ensure the success of your business going forward?*"

Annex 2 – Matching EIBIS and ORBIS

In the analysis, data from the EIBIS survey are matched with balance sheets and profits and loss data collected by ORBIS. For each firms, specific qualitative and quantitative information are associated. This enables to analyze the perceptions on the barriers to investment related at the light if to the investment with hard data, controlling for traditional investment determinants such as the financial and profitability position of a firm.

Table 2.1 presents some basic summary statistics related to the explanatory variables used in the regressions explained in the main text, namely debt to assets ratio, return on assets and cash ratio. The statistics are reported both at the EU level and fro the three regions considered, periphery, cohesion and other economies. Besides, Table 2.1 also reports the proportion of SMEs, young firms and finance constrained firms as derived from the information of the EIBIS. Figure 2.1 depicts the distribution of these variable across the three economic regions considered.

Table 2.1   Basic characteristics of the firms in our sample

		Leverage	Return	Cash ratio	Proportion SME	Proportion Young	Finance Constrained
Europe	Mean	0.63	0.06	0.11	50%	11%	6%
	St. Dev.	0.34	0.18	0.15			
Periphery	mean	0.64	0.05	0.09	60%	9%	10%
	St. Dev.	0.28	0.10	0.12			
Cohesion	mean	0.53	0.07	0.10	49%	13%	8%
	St. Dev.	0.46	0.15	0.13			
Other economies	mean	0.63	0.06	0.12	47%	11%	5%
	St. Dev.	0.34	0.20	0.16			

Source: Authors' calculations based on EIBIS-ORBIS database.

Several stylized facts are worth noticing. First, while we do not find significant differences in the cash ratio distribution across regions: firms in cohesion countries seem to exhibit a relatively lower leverage level whereas firms in periphery countries present a lower return on assets level. Also, periphery countries seem to be characterized by a higher proportion of SMEs and firms which are finance constrained while cohesion countries concentrate a higher proportion of young firms.

Figure 2.1 – Cumulative density distribution of the main corporates variables used in the regressions
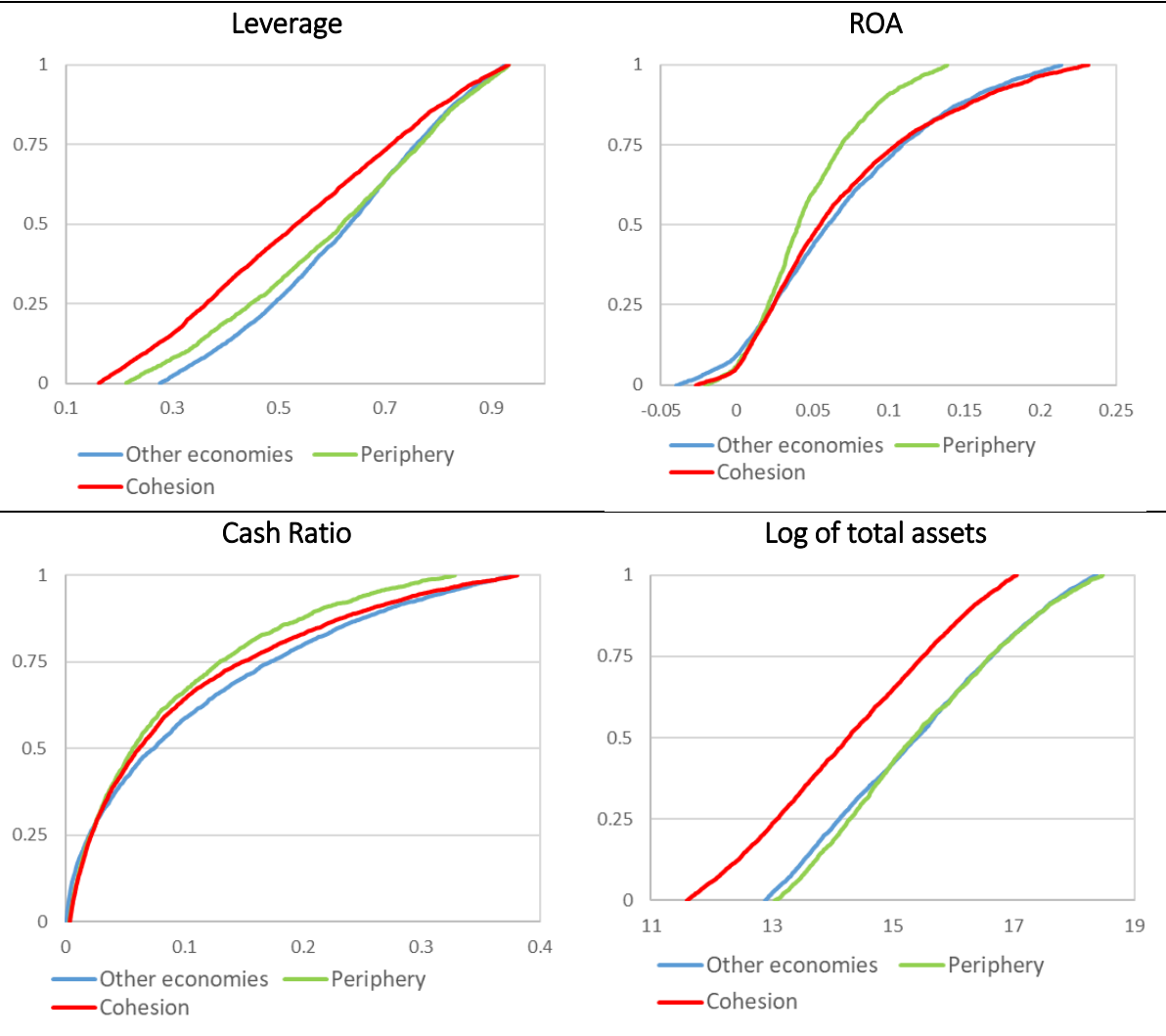
Source: Authors' computations based on EIBIS-ORBIS database.

Can survey-based information help to assess investment gaps in the EU?

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